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small size arteries is such that dilatation techniques using rigid metallic dilators will give good, lasting results in patients with this clinical syndrome.

Summary

Fibromuscular hyperplasia of external iliac arteries may produce symptoms of arterial insufficiency of lower extremities. Our experience emphasizes the technical advantages of an alternative, simpler surgical procedure such as open dilatation of the external iliac arteries through common femoral arteries using metallic rigid dilators.

REFERENCES

1. Wylie EJ, Binkley FM, Palubinskas AJ: Extrarenal fibromuscular hyperplasia. *Am J Surg* 112:149, 1966
2. Twigg HL, Palmisano PJ: Fibromuscular hyperplasia of the iliac artery. *Am J Roentgenol* 95:418-423, 1965
3. Stanley CJ, Gewertz LB, Bove LE, et al: Arterial fibrodysplasia. *Arch Surg* 110:561-566, 1975
4. Najafi H: Fibromuscular hyperplasia of the external iliac arteries. *Arch Surg* 92:394-396, 1968
5. Dotter CT, Judkins MD, Frische LH, et al: The non-surgical treatment of ilio-femoral arteriosclerotic obstruction. *Radiology* 86:871-875, 1966
6. Dotter CT, Rosch J, Anderson MJ, et al: Transluminal iliac artery dilatation. *JAMA* 230:117-124, 1974
7. Ehrenfeld WK, Wylie EJ: Fibromuscular dysplasia of the internal carotid artery. *Arch Surg* 109:676-681, 1974
8. Fry WJ, Brink BE, Thompson NW: New techniques in treatment of extensive fibromuscular disease involving the renal arteries. *Surgery* 68:959-967, 1970

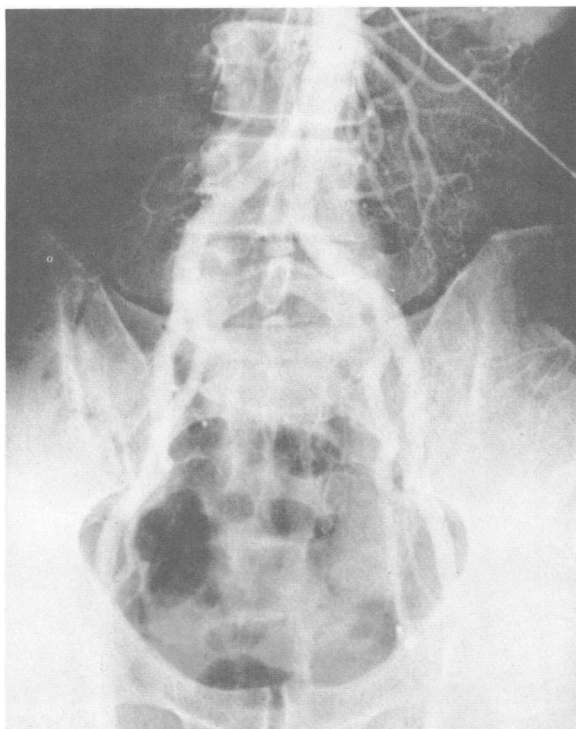


Figure 3.—Aortogram 24 months following operation showed no evidence of fibromuscular hyperplasia.

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Retroperitoneal Emphysema After Colonoscopic Polypectomy

SIDNEY YASSINGER, MD
ROBERT C. MIDGLEY, MD
DAVID S. CANTOR, MD
TOMMY POIRIER, MD
THOMAS J. IMPERATO, MD
Sacramento, California

BLEEDING AND PERFORATION are the most common complications of colonoscopic polypectomy.^{1,2} Retroperitoneal emphysema, a rare complication of sigmoidoscopy, barium enema^{3,4} and upper gastrointestinal endoscopy,⁵ was recently reported as a complication of colonoscopy.⁶ Two cases of widespread retroperitoneal emphysema that developed after colonoscopic polypectomy were recently encountered. One of these cases had pronounced subcutaneous and mediastinal emphysema as well. A description of this unusual complication of colonoscopic polypectomy in these two patients and an approach to its management form the basis of this communication.

Reports of Cases

CASE 1. A 61-year-old man reported to the emergency room because of an episode of hematochezia. Sigmoidoscopy showed only internal hemorrhoids. Subsequent barium enema examination showed polypoid lesion at the hepatic flexure. The patient was referred to the gastroenterology service for colonoscopy.

The patient was given 30 mg of alphaprodine (Nisentyl®) intravenously as an analgesic during the procedure. An Olympus CF-LB2 colonoscope was introduced into the rectum and advanced to the hepatic flexure area without difficulty. In the region of the hepatic flexure, a 1.5 to 2.0 cm diameter smooth pedunculated polyp was found. The colonoscope was advanced to the cecum and no further lesions were seen. The colonoscope

From the Section of Gastroenterology, Department of Internal Medicine, University of California, Davis, School of Medicine; and Sacramento Medical Center and Mercy Hospital, Sacramento, California.

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Reprint requests to: Sidney Yassinger, MD, Section of Gastroenterology, Department of Internal Medicine, University of California, Davis, UCD Professional Building, 4301 X Street, Sacramento, CA 95817.

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was then withdrawn to the hepatic flexure and the polyp was excised with a coagulating snare without difficulty. Suction was applied to the excised polyp, but the initial attempt at removal from the colon was unsuccessful. The instrument was reinserted to the level of the polypectomy site which was observed not to be bleeding. After slow withdrawal of the colonoscope, the free polyp was found in the descending colon and successfully removed. The patient tolerated the procedure well and did not complain of discomfort following termination of the procedure. However, a large pneumocele was discovered on the abdominal examination after the procedure.

Shortly thereafter, the patient was found to have crepitation in the subcutaneous tissues of neck, thorax, abdominal wall and groin. Examination of the heart and lungs showed no abnormalities. The abdomen was mildly distended and tympanitic. Mild direct tenderness was found in both lower quadrants with no rebound tenderness and normally active bowel sounds. The scrotal sac was distended to 10 cm in diameter with air.

On x-ray examination of the abdomen, pneumoperitoneum with free air below the diaphragm was noted (Figure 1), and pneumoretroperitoneum with extensive retroperitoneal air. X-ray films of the chest showed subcutaneous emphysema of the neck and lateral chest wall with pneumomediastinum (Figure 2). Laboratory studies gave the following values: hematocrit, 40.3 percent; hemoglobin, 13.7 grams per dl; leukocyte count, 9,300 with 73 percent polymorphonuclear leukocytes, 13 percent bands, 8 percent lymphocytes, 2 percent monocytes and 2 percent eosinophils. Results of analysis of urine were within normal limits. Histologic examination of the excised polyp showed a submucosal lipoma with no evidence of malignancy.

The patient was prescribed a regimen of nothing by mouth and intravenous fluids. The pneumocele was decompressed with an 18-gauge needle. Twenty-four hours after colonoscopy, a temperature of 37.8°C (100°F) (orally) developed and the leukocyte count had increased to 14,300 with 63 percent polymorphonuclear leukocytes, 11 percent bands, 23 percent lymphocytes, 2 percent monocytes and 1 percent eosinophils. Peritoneal signs were absent. Intravenously given clindamycin and gentamicin were started with prompt resolution of the fever. Blood cultures drawn before institution of antibiotics were negative. Seven days after colonoscopy and six days

after the institution of antibiotic therapy, resolution of the subcutaneous and retroperitoneal air was shown on x-ray films. Oral feedings were begun and the patient was subsequently discharged in good condition.

CASE 2. A 71-year-old man, in whom multiple colonic polyps were found on a barium enema study in September 1975, was referred for colon-

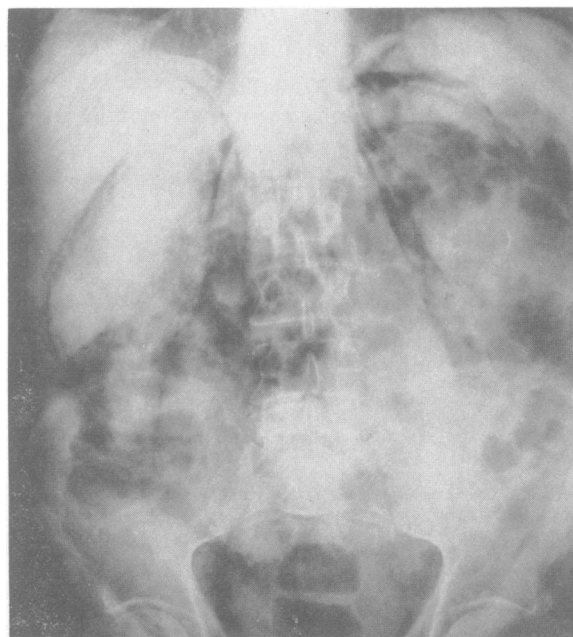


Figure 1.—X-ray film of the abdomen (case 1) showing retroperitoneal air outlining both kidneys.

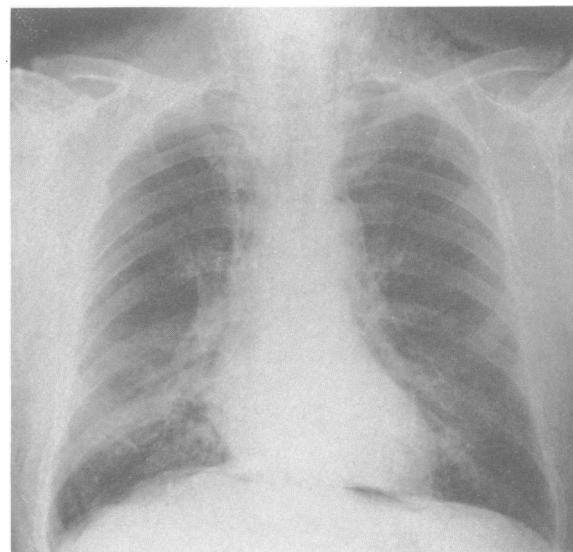


Figure 2.—X-ray film of the chest (case 1) showing subcutaneous air in the neck, pneumomediastinum and air under the diaphragm.

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oscopy. Only one of the polyps was amenable to removal with the coagulating snare. Biopsy studies of other sessile polyps showed fragments of adenomatous and hyperplastic polyps. Atypical hyperplasia was found in one of the sigmoid colon polyps. It was elected to continue to observe the lesion and colonoscopy was repeated in April 1976.

The patient was sedated with 50 mg of intravenously given meperidine and 10 mg of diazepam. An additional 8 mg of diazepam was required during the procedure. An Olympus CF-LB2 colonoscope was passed without difficulty to the cecum where a filling defect was thought to be an inverted appendiceal stump. Biopsy specimens were taken of five small, less than 1 cm in diameter, sessile polyps at various levels of the colon and the polyps were fulgurated. A large 1 cm diameter polyp on a broad-based stalk, seen at the junction of the descending and sigmoid colon, thought to be suspicious for carcinoma, was removed with some difficulty using the coagulating snare. Because the snare had not cut completely through the polyp when completely closed, the polyp was placed against the instrument tip and the snare pulled until it cut through and released. An additional polyp in the sigmoid colon (8 mm in diameter) was also removed by snare cautery without problem. The sites of biopsy, fulguration and polypectomy were found to be unremarkable on reexamination. The patient tolerated the procedure well, except for complaint of abdominal pain when the snare was manually pulled through the large sessile polyp. The pain subsided within two to three minutes. Following the procedure, x-ray films of the abdomen were obtained because of the difficulty encountered with the removal of the suspicious polyp. Retroperitoneal air, a small amount of air below the right hemidiaphragm and air outlining the outer wall of a loop of small bowel were found.

Despite absence of peritoneal signs on examination, abdominal exploration for colonic perforation was felt indicated by the consulting surgeon because of the free intraperitoneal air. At surgical operation no definitive evidence of free perforation was found. Air in the leaf of the mesentery and a small serosal tear were seen in the rectosigmoid colon; the tear was closed with one 4-0 silk suture. There was no escape of gas in this area and no evidence that this was the site of perforation. Cultures of peritoneal fluid taken at surgery grew *Escherichia coli*. Administration of

cephalothin intravenously, and later clindamycin, was instituted. The patient improved to the point that he was discharged on the ninth hospital day. Examination of the biopsy specimens taken at colonoscopy showed fragments of hyperplastic and adenomatous polyps. The polyps suspicious for carcinoma proved to be a submucosal lipoma and an adenomatous polyp.

Discussion

Fiberoptic colonoscopy is now a routine procedure in many communities, having gained widespread acceptance as a means of diagnosis and management of colonic diseases.⁷⁻¹⁰ Utilization of flexible snares and electrosurgical current has revolutionized the approach to colonic polyps.^{11,12} A recent summary of the literature on the complications of colonoscopic polypectomy showed that the incidence of perforation, bleeding and overall morbidity was less than 1 percent.² Retroperitoneal emphysema is a well-known but infrequent complication of sigmoidoscopy and barium enema,^{3,4} and has been reported only once previously as a complication of colonoscopy.⁶

In case 1 and the previously reported case,⁶ the procedure was done without technical difficulty. The first sign of a complication was the discovery of a large pneumocele followed by widespread subcutaneous emphysema. On the other hand, multiple snaring, biopsy studies and electrosurgical procedures increased the chance of encountering a complication in case 2. Since case 1 was managed nonoperatively and no obvious perforation of the colon was found at operation in case 2, the site of air leakage remains speculative. The most likely site of leakage in case 1 would appear to be below the peritoneal reflection since the air initially appeared in the scrotal sac. In case 2, air in the leaf of the mesentery and a small serosal tear were found in the rectosigmoid at operation, but no evidence was found that this was the site of perforation. Air insufflated during the procedure could have been forced through a small perforation at any of the biopsy or polypectomy sites. A small undetected rectal tear may have occurred in either case as a result of manipulation of the colonoscope. Air insufflation causing rupture of a small diverticulum is another possibility, but no evidence of diverticuli was observed at colonoscopy or on barium enema studies in either case.

Histologic examination of the polyp in case 1 and one of the polyps in case 2 showed a sub-

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mucosal lipoma. Usually these neoplasms are not pedunculated, are easily recognized at colonoscopy and need not be removed unless symptomatic. In both of our patients pedunculated polyps were encountered. The submucosal nature of these polyps was not apparent and they were consequently excised. Removing a submucosal lesion probably increased the risk of perforation.

Neither the previously reported patient nor these two patients were very ill. In all three there were some signs of peritoneal irritation, but within a short time after initiation of broad-spectrum antibiotic therapy, two patients went on to uneventful recovery with complete resolution of all subcutaneous and retroperitoneal emphysema. It is quite probable that broad-spectrum antibiotic therapy alone would have been efficacious in case 2. In patients with gross tears and perforation due to colonoscopy, operative intervention will usually be required. We recommend that a patient in whom retroperitoneal emphysema develops following colonoscopy, with or without polypectomy, even in the presence of a small amount of intraperitoneal air, be managed conservatively. Treatment should consist of nothing by mouth, intravenous fluids and broad-spectrum antibiotics with close clinical observation. Such a conservative, nonoperative approach may be pursued unless clinical deterioration occurs.

Summary

Two cases in which retroperitoneal emphysema developed in addition to free intraperitoneal air

after colonoscopic polypectomy are reported. In one case there was a benign clinical course and the patient was successfully managed nonoperatively. In the other patient, also with benign abdominal findings clinically, exploratory celiotomy was done to find and repair the site of perforation. The site of perforation was not found. Gross tears or perforation as a result of colonoscopic manipulation usually will require immediate surgical operation. Operative intervention for small perforations due to biopsy electrocautery should be reserved only for patients in whom there is no response to medical management within 48 to 72 hours.

REFERENCES

1. Geenen JE, Schmitt MG, Wu WC, et al: Major complications of colonoscopy: Bleeding and perforation. *Am J Dig Dis* 20:231-235, Mar 1975
2. Berci G, Panish JF, Schapiro M, et al: Complications of colonoscopy and polypectomy. *Gastroenterology* 67:584-585, Oct 1974
3. Brunton MB: Retroperitoneal emphysema as a complication of barium enema. *Clin Radiol* 11:197-199, Jul 1960
4. Seaman WB, Wells J: Complications of the barium enema. *Gastroenterology* 48:728-737, Jun 1965
5. Katz D, Cano R, Antonelle M: Benign air dissection of the esophagus and stomach at fiberoesophagoscopy. *Gastrointestinal Endosc* 19:72-74, Nov 1972
6. Lezak MB and Goldhamer M: Retroperitoneal emphysema after colonoscopy. *Gastroenterology* 66:118-120, Jan 1974
7. Wolff WI, Shinya H, Geffen A, et al: Colonofiberoscopy—A new and valuable diagnostic modality. *Am J Surg* 123:180-184, Feb 1972
8. Overholt BF: Colonoscopy—A review. *Gastroenterology* 68:1308-1320, May 1975
9. Marks G, Moses JL: The clinical application of flexible fiberoptic colonoscopy. *Surg Clin North Am* 53:735-756, Jun 1973
10. Schmitt MG, Wu WC, Geenen JE, et al: Diagnostic colonoscopy—An assessment of the clinical indications. *Gastroenterology* 69:765-769, Sep 1975
11. Wolff WI, Shinya H: Polypectomy via the fiberoptic colonoscope. *N Engl J Med* 288:329-332, Feb 1973
12. Williams CB, Muto T, Rutter KRP: Removal of polyps with fiberoptic colonoscope: A new approach to colonic polypectomy. *Br Med J* 1:451-452, Feb 1973